

Application No. 10/578,125
Amendment dated January 6, 2010
Reply to Office Action of July 8, 2009

Docket No.: 18050/0207970-US0

EXHIBIT A

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To
Ms. Brenda Bernardi
USPTO

Application Number: 10/578,125

Dear Mrs. Bernardi,

In response to the Office Action mailed on July 08, 2009, claims 5 and 36 have been amended. Claim 6 has been canceled. No new matter has been added.

Regarding section I of the Detailed Office Action, I strongly disagree with some of your conclusions, especially since I believe that I can see certain and even fundamental misunderstandings in your interpretation of some patent documents. As consequence, these documents and the combination thereof are widely unrelated to the claimed invention. In the following, I will set forth my detailed observations.

Response to Detailed Action

1. Overview

I believe that Mackawa and Wilkinson are simply not relevant to my patent application, even in combination. They do not add anything new to the acknowledged prior art in

my own patent specification, at least if we are talking about the topic of hybrid discs and DVD-CD combination discs – commercialized in the form of the “DVD-plus” and “DualDisc”. (“DVD-plus” is obviously mentioned in the patent specification, as the DVD-plus has been introduced in 1999, and therefore is prior art.)

Maekawa and Wilkinson are not related to hybrid discs in any form, whereas we have presented documents referring to hybrid discs, and very specifically referring to DVD-CD hybrids and DVD-plus. Some of these documents were prepared by the promoters of the DVD-plus format, which is the first commercial form (Sonopress GmbH was the first replicator in 1999, Dieter Dierks the inventor and applicant of various related patent documents). The combination of Maekawa and Wilkinson might lead an average engineer to the “development” of a hybrid DVD-CD disc. However, I can’t see where some specific conclusions could be drawn. The documents don’t suggest any changes specifically to the DVD standard, and also not the CD standard. (Reasons will be given later.)

I also got the impression that you are over-interpreting these documents and to a certain extent also Thompson, and I will give some detailed reasons for this at the appropriate places.

2. Response to Section 1 of Detailed Action

Maekawa is a document referring to disc servos and tracking, certainly referring to CD tracking. However, the CD standard is not explained in any “deeper” or detailed fashion. In fact, the cited passages (same as in the previous Office Action mailed on October 28, 2008) can be regarded as basic knowledge.

a) page 1, paragraph [0005]

“Optical discs including read-only type optical discs such as an audio CD (compact disc) and a CD-ROM and recordable type optical discs such as CD-R or the like are driven by optical disc drives. These optical disc drives are normally equipped with an optical pick-up which is movable along a radial direction of an optical disc and a sled motor for moving the optical disc in the radial direction thereof.”

b) page 6, paragraph [0130]

“As shown in Fig. 3, these ENCODE EFM signals are formed from pulses each having a predetermined length (period) of any one of 3T-11T.”

Note that this passage actually doesn't refer to the disc itself, but to the drive electronics. This is not exactly what you have written. (However, there is obviously a direct relationship between disc structures and drive electronics, encoding/decoding etc.)

Maekawa, which refers to specific disc (CD) servo techniques, doesn't add anything new to my patent specification, which refers to one standardized full CD standard (ECMA-130), and explains pit structures in much more depth.

There is no indication that any deviations from any disc standard would be encouraged by this document. It just explains the CD standard in a very short way, as known prior art. There is absolutely no relationship to hybrid DVD-CD discs, as written by yourself. (1st Office Action mailed on October 28, 2008, Detailed Action, page 2: “Maekawa '871 fails to disclose the data carrier has at least one further data layer.”)

Wilkinson et al. is certainly more “specific” to my patent application, but still doesn't add anything relevant to the discussion of hybrid discs, and nothing which I wouldn't have mentioned as prior art in my patent description.

Wilkinson '595 teaches two-sided discs, with data read from opposite sides of the carrier (page 6, paragraph [0053]): “Double sided discs can be generated by utilizing two-molds one for each side.”

Of course, two-sided discs are mentioned in my own patent specification, as being prior art at time of the claimed invention. Two-sided forms of the DVD are known since long (DVD-10, DVD-14, DVD-18), they are actually part of the DVD standard. (ECMA-267 3rd edition.) One specific reference has already been cited on page 2 of my patent

application as published in US 2007/0076576 A1, paragraph [0018]. The existing DVD-plus in various forms is covered just before, in paragraph [0017]. And on page 1 I mention another hybrid disc, the (hybrid) SACD/CD, which is single-sided. Note that there are specific patent documents to any of these hybrid discs.

As the CD and DVD standards including hybrid forms (DVD-CD read by one side or opposite sides) are described as background art in my patent application, it is not clear to me in which sense the combination of Maekawa and Wilkinson does add any new aspects to my own presentation of prior art. In fact, you write yourself that Wilkinson “is not intended to disclose the specific range of DVD substrate thickness of less than 0.570mm and at least 0.525mm”. This is because Maekawa and Wilkinson just refer to the existing CD and DVD standards (respectively), they don’t show any modification. In this sense, the combination of Maekawa and Wilkinson presents both the CD and DVD standards, but doesn’t modify them. They might lead to the idea or “development” of a two-sided DVD-CD, which is presented in the present application already as prior art (DVD-plus). Therefore, the combination of Maekawa and Wilkinson doesn’t add anything new to my patent application, if we are considering the field of the claimed invention. (And not the technical fields to which Maekawa and Wilkinson refer, such as disc servos and disc mastering, for instance.)

At this point, I also would like to take the opportunity to correct a real misunderstanding of another relevant document (Wilkinson ‘595), which is important at this place because, in my opinion, also Wilkinson doesn’t “bend” or extend existing DVD specifications! You wrote in the Detailed Action of the first Office Action (mailed on October 28, 2008), page 7: “Wilkinson ‘595 teaches the pits and lands of the at least one DVD layer are enlarged to ensure optical compensation for a degradation of the reading signal (page 6, paragraph [0051])”.

I do not think that this is true. Wilkinson refers mainly to the production of glass masters and disc stampers (“sons”), which are used for disc replication lines, and therefore in the field of disc production: “Finally, the length of each resulting pit will be primarily determined by the duration of the corresponding EFM (or EFM plus) data

pulse, as will be the length of each intervening land." This just means that the laser will have to write structures of different lengths for CD (EFM) or DVD (EFMplus) masters, which is just normal, as the structures are in both cases of variable length (3T to 11T). And further, there are some sync codes with different constraints, which can be longer than 11T. (See also Wilkinson page 5, [0044]: "... the integer n may be 3 to 11, or 14. Every EFM or EFMplus coded data stream always contains pulses and intervening temporal spacing comprising all of the possible nT durations.")

It is therefore clear for the skilled person, who will be an engineer concerned with disc replication, that there is no evidence in Wilkinson for a "manipulation" or deviation from the (normal) CD or DVD standards. (I admit that Wilkinson is very hard to read. This application is referring to disc mastering, but also to improvements in disc tracking, see page 2, [0015], page 1 [0003] and main claim. However, as stated, I can't see any relationship to hybrid discs or deviations from existing disc standards.)

The field of Wilkinson gets also very clear if you look on page 25, paragraph [0247]. "Finally, it should be noted that the improvements of the invention may be observed not only in master optical recording structures, but also in stampers (needed for replication machines!) replicated from such masters and in structures replicated from such stampers ... Since all the replicas ... will display the improved features of the invention, all would fall within the inventive concept."

Reflecting about this, Wilkinson '595 (page 6, paragraph [0051]) can't be read in the sense that some DVD pits have been slightly enlarged, compared to the specifications of ECMA-267, even less "to ensure optical compensation for a degradation of the reading signal" as stated in Office Action mailed on October 28, Detailed Action, page 7.

The cited passage from Wilkinson "Finally, the length of each resulting pit will be primarily determined by the duration of the corresponding EFM (or EFM Plus) data pulse, as will be the length of each intervening land" just means that the length of the writing pulse will write a 3T-11T pit mark, and maybe a 14T sync mark. (Written into the photoresist layer of a disc master, of which some copies called "stampers" are made,

of which either other stampers are made or some discs are replicated. Note that there are several methods to manufacture optical discs from disc masters, speaking about optical disc production.)

Therefore and in short, Wilkinson '595 doesn't present or introduce any deviations from the DVD and CD disc standards. I believe every or at least most experts in this field would come to the same interpretation.

"Primarily determined" in the above citation (Wilkinson '595) is correct, as there might exist different writing strategies based on exact heat processes, see also the figure on the first page of Wilkinson (waveform shaping circuit). However, we are referring always to exact writing strategies for 3T to 11T pit/land structures, not for "slightly enlarged 3T structures". Of course you could produce any length "in principle", but there is no hint that Wilkinson '595 is departing from optical disc standards, specifically not from the DVD standards. Also not if combined with Maekawa, which covers the normal CD standard and CD structures.

Now, you write that the use of a "thin" DVD substrate of between 0.570mm and 0.525mm in a hybrid disc does not constitute an inventive step. ("This limitation is rejected on the basis of inventive step for discovering the optimum of workable ranges by routine experimentation".)

Firstly, this is a personal opinion, which is not based on the before mentioned documents. Secondly, there is strictly speaking no "workable range" if you are manufacturing a DVD-5, which is important in this context. If you read through an optical transparent substrate, the disc reader has to compensate for a given spherical aberration, which is a function of substrate thickness and the refractive index of the material. DVD or CD drive optics don't have any measures to correct this spherical aberration (at least this is nowhere demanded in the standards, even if you could construct such a reader). They use a fixed aberration compensation. In this sense, there exists in both cases an optimum thickness, which is 0.6 mm for the DVD, 1.2 mm for the CD. (This is still true even if there should be a few DVD and/or CD drives on the

market nowadays which are using an active spherical aberration compensation by a servo, as the vast majority of CD/DVD drives does not.)

I think this is not clear to you, because you write: "However, the presence of 'standards' layer thicknesses are just one example of a preferred embodiment agreed upon value or range of values derived for commercial reasons."

This simply doesn't make sense! You don't agree on "0.6 mm" or "0.5 mm" just "for commercial reasons", you have to agree on such a fixed value as a standard value, as spherical aberration always has to be compensated in the drive optics. A DVD reader optics designed for reading through 0.6 mm transparent substrates just wouldn't read a DVD which is made of say two 0.5 mm half discs, because there will be introduced a significant spherical aberration error. (There is further the issue of focus range of an optical drive. However, alone the issues/problems related to spherical aberration mean that you have to "settle" on some value, and on defined thickness ranges. Therefore, CD and DVD standards such as ECMA-130 and ECMA-267 give exact thickness recommendations including tolerances for production margins, for different and good reasons.)

Further, if you look to ECMA-267, 3rd edition, 2001, Fig. 9, the optimum thickness for a DVD-5 (half-disc) substrate is exactly 0.6 mm, within the index range from 1.56 to 1.65. For lower indexes (between 1.56 and 1.45), the optimum thickness is actually slightly higher than 0.6 mm, not lower. (However, it is reasonable to assume that any replicator will aim for 0.6 mm thickness of a single-layer DVD substrate as optimum thickness, for all practical purposes.)

This means that the thickness of the common (polycarbonate) DVD half disc (index about 1.58, for red light) will be set exactly to 0.6 mm, because this is the optimum value for read-back. Nobody would suggest to intentionally produce "0.57 mm" DVD half-discs, as they would not be as good as 0.6 mm half-discs. The margin in the DVD standard is primarily meant as production tolerances, as it was the case for the CD. (See

ECMA-130, section 8.6. The optimum value for the CD optics is 1.2 mm, the margins are +/- 0.1 mm.)

Of course, the purpose of a "single thin layer DVD" (DVD substrate < 0.570 mm) in a DVD-CD hybrid is to ensure that you can manufacture such a disc within 1.5 mm (complete, overall) thickness, which is the upper limit for both DVD and CD discs. My first online article mentions the aim to manufacture a hybrid DVD-CD within 1.5 mm: <http://www.loehneysen.de/archiv/2004/dvdsacd/dvd-cd.htm>

(This article is not a complete description of the invention, but meant as introduction. The above aim was clearly expressed: The manufacturing of a hybrid DVD-CD of equal or less than 1.5 mm. Of course, this 2004 article contains some references to Dieter Dierks and Sonopress, who have introduced the DVD-plus. I state in this online article that a hybrid DVD-CD above the 1.5 mm limit could be forbidden by the DVD Forum, as being out of range of one important mechanical DVD specification. The former DVD-plus - which was thicker than 1.5mm - had only be tolerated by the DVD Forum. They could have stopped this disc at any time, which I knew from my personal contacts in the optical disc industry.)

3. Historical Overview

Some further and historical background of the DualDisc and single thin layer DVD: "After test marketing DualDisc in Boston and Seattle in February 2004, the 'flipper' concept (a half-thickness DVD bonded back-to-back to a thinner-than-usual CD) got the official go-ahead from the DVD Forum's steering committee last June and was formally launched by all the major record labels in the US in October."

"The ratified revision to the DVD standard is called 'single thin layer disc.' After complaints from Philips, the CD logo is not used. Like conventional CDs and DVDs, flippers have a maximum allowable thickness of 1.5 mm, but whereas the factories that make CDs and DVDs are aiming for 1.2 mm, flipper presses are aiming for just below 1.5 mm. So there is very little manufacturing tolerance."

Source: <http://www.multimediamanufacturer.com/reports/Sep05dualdisc.htm>

When the DVD-plus was introduced in the market in 1999, it was clearly thicker than 1.5 mm. Even in 1999, Sonopress GmbH tried to reduce the DVD-plus thickness to 1.5 mm, and they didn't succeed.

The commercial DualDisc standard (2004) recommends the use of a "DVD single thin layer". I have been in direct contact with many people in the replication industry just before the definition of these (2004) standards, and sincerely believe that the referred standards are directly based on my invention.

If the DVD substrate thickness within a DVD-CD or DualDisc is reduced under 0.570 mm, you have to compare this value to 0.6 mm, not to 0.570 mm, which certainly can't be seen as normal DVD production aim but as maximum tolerance for DVD disc production. I didn't find any hard evidence that DVD-plus discs have been commercially produced with DVD substrate thicknesses of less than 0.6 mm, say "0.58 mm" (which would be situated within DVD specifications). There are maybe some hints of former laboratory experiments with much thinner DVD substrates around 0.50 mm in patent applications, which would not work. (Even this is just a speculation, based on two existing applications, which are related to the commercial DVD-plus and might be just theoretical attempts.) Without hard evidence, I can only refer to these documents, which are DE 200 12 391 U1, and WO 2004/017306. Both documents are relevant to hybrid DVD-CDs/"DVD-plus".

I would also like to refer to EP 1 436 809 B1, which "solves" the problem of a hybrid DVD-CD in less than 1.5 mm, but which is unrelated to my invention, and also couldn't be manufactured in any practical form. The main problem here is that you have to read the DVD layer through a CD layer at a top surface, and that you have to read the bottom CD layer through a DVD layer in the middle. They didn't find a practical solution which would permit the correct reflection values for both standards if read by infrared CD lasers and red DVD lasers, i.e. >70% reflection for the CD side and >45% reflection for the DVD side.

The three documents easily prove that there has been significant investigation on hybrid DVD-CD discs in thinner form than the commercially produced DVD-plus disc. The aim to manufacture DVD-CD discs at 1.5 mm or below is much easier with help of my invention, otherwise you won't have any reasonable production margins. Therefore, my invention has been integrated into the DualDisc standard.

My task in the year 2003 was to find a form of hybrid DVD-CD/"DVD-plus" (the commercial form which existed since 1999) which would be thinner than or at most 1.5 mm, which would work in a satisfactory way and could be mass-produced. I had already done some disc-related work before, when I was proposing a hybrid SACD-DVD-A disc. The proposal failed because of "political" reasons, although I had possible clients for such discs. (The format owners of SACD didn't give their agreement.)

From my contact at the Philips Licensing and IP department, I had received the information that a DVD-plus could be produced "in 1.6mm" (end of 2002).

From my contact of Sonopress GmbH I knew that "their" DVD-plus could be further thinned down to about 1.54mm. (I guess that the "specification" would have been a 0.9 mm CD + 0.6 mm DVD-plus + glue layer of about 40 micrometers, or 0.04 mm.) They "maybe" could offer 1.52 mm. (Probably thinner glue layer.) We also had some talks about the desirability of a DVD-plus disc in less than 1.5 mm overall thickness. From before and as at least theoretical attempt, the Sonopress applications DE 200 12 391 U1 and DE 299 14 540 U1 confirm that a very big replication company (with supposedly good engineers in the company staff) had looked for a solution of a hybrid DVD-CD in 1.5 mm or less overall thickness. Sonopress failed here in 1999 and 2000, as the two applications are clearly non-enabling, and didn't lead to an improved form of DVD-plus.

The article at <http://www.sonopress.de/sononews/15-99/dvdplus.htm> shows an early attempt for such a 1.5 mm disc, with 0.6 mm standard DVD half disc. (As disclosed in DE 200 12 391 U1, this disc is actually theoretical and therefore always thicker than 1.5 mm, even more if you consider the production margins of the proposed DVD-plus disc, which have to be considered.)

I have cited several articles by Barry Fox in Hi-Fi News, who is a well-known technical journalist with a certain name and has worked in the patent area before he became a journalist dedicated to music and technology. The cited article series shows that there was considerable work on the problem to achieve a thinner than commercially available DVD-CD (DVD-plus), during several years before I filed the present application, and that before several companies didn't succeed in meeting this aim. Mr. Fox gives some specific thicknesses of measured discs, in the cited article series. All discs were thicker than 1.5 mm.

Now, my patent application certainly is written with the aim of manufacturing a hybrid DVD-CD in less than 1.5 mm, at least as option. (The main claims are not restricted to ≤ 1.5 mm, but this is the clear aim. This is easily proved by my first Internet article, presented with co-author Ulrich v. Löhneysen, here again:

<http://www.loehneysen.de/archiv/2004/dvdsacd/story.html>

<http://www.loehneysen.de/archiv/2004/dvdsacd/dvd-cd.html>

After I had filed the present application in 2003, I spoke to several people in the industry (Dr. Katern of Sonopress GmbH, Martin Eichlseder of Krauss-Maffei, replication and plastics department; Roland Lacher, CEO of Singulus AG, Dr. Eberhardt, then head of the mastering department of Singulus in the Netherlands, and others). I told that I had, for my feeling, succeeded in the development of a "legal" DVD-CD within 1.5 mm thickness. And that I had developed specifications for the CD, DVD side and for the disc materials.

Enlarged pit structures in very thin CD layers had already been state of the art, as actually seen in EP 1 436 809 B1, page 1, paragraph [0003]. In the next paragraph, [0004], Mr. Dierks writes explicitly that a hybrid DVD-CD in less than 1.5 mm thickness is something which is "hard to achieve", and that commercially manufactured DVD-plus discs were – at this time – "very slightly thicker than 1.5mm". (German

passage: *“Tatsächlich hergestellte Hybrid-CD-DVDs haben eine Dicke, die ganz geringfügig oberhalb von 1,5 mm liegt.”*)

It is obvious for an expert that alone this document proves that we have some real problem here, as Mr. Dierks and Sonopress had personally introduced the DVD-plus into the marketplace – in 1999!

Mr. Dierks writes in paragraph [0002] of the description of EP 1 436 809 B1 that the DVD half-disc has a thickness of “0,6 mm”. Important is the last phrase of paragraph [0002], which I translate: “Possibly the DVD can be manufactured marginally thinner than 0.6 mm.” I read this statement in the sense that the DVD half disc could be reduced to, say, 0.58 mm, but stays within the DVD specification.

I would suspect that this proposal of a DVD-plus with a “marginally thinner than 0.6 mm” (say “0.58 mm”) DVD has never been used in production, because they still couldn’t produce a DVD-plus within the 1.5 mm limit of overall disc thickness – at least not in a reliable manner, as you have to consider certain tolerances and margins for practical disc production. (I believe that there might have existed some non-public laboratory DVD-plus discs which were slightly thinner than 1.5mm, and which are not based on the claimed invention and claim 5 of my application. Note that I don’t see “1.5 mm” overall disc thickness as a feature which defines the claimed invention, it is a desired result.)

Modified disc materials with lower index than polycarbonate could be used for hybrid DVD-CD production, but this feature can’t be patented as such, because DVDs and CDs can be produced with materials in the index range from 1.45 to 1.65. (Indexes even lower than 1.45 might be problematic, as leading to serious problems with spherical aberrations in thin DVD substrates. They are also non-standard.)

The combination of a thinned DVD layer (“single thin layer DVD”, DualDisc-DVD) and enlarged pit-structures in thin CDs ($\leq 0.95\text{mm}$), all according to the claimed invention, has demonstrably led to a desired and manufacturable solution for a hybrid

DVD-CD disc within the 1.5 mm overall thickness limit. (I believe in the most direct manner, after I had contacted people within the replication industry, and with contacts in the music industry and to the DVD Forum.)

Discs according to my invention and the later named "DualDisc" standard were introduced in 2004, also by Dieter Dierks (Kool Shen "Dernier Round", DVD-plus of about May 2004, which is the first commercial DVD-plus in less than 1.5 mm, according to my best knowledge. I actually bought and measured three different commercial samples of the DVD-plus "Kool Shen" albums, with the friendly help of Krauss-Maffei in Munich. So according to our measurements, this DVD-plus could be seen as first DualDisc, which hadn't yet been standardized at this time, but some weeks later. Krauss-Maffei had done some former work on the DVD-plus, I believe together with Sonopress/Bertelmann. Krauss-Maffei already had told me such as Singulus AG before that my DVD-CD proposals would work in practice. Like me, they were interested to measure the "new" commercial DVD-plus discs, which could have been manufactured under my proposed specifications. Our suspicion was confirmed when three different test discs used DVD half-discs of less than 0.57 mm.)

Please have a look to the DualDisc article of Wikipedia, reading:

"DualDiscs first appeared in the United States in March 2004 as part of a marketing test conducted by the same five record companies who developed the product. The test involved thirteen titles being released to a limited number of retailers in the Boston, Massachusetts, and Seattle, Washington, markets. The test marketing was seen as a success"

"DualDiscs appear to be based on double-sided DVD technology such as DVD-10, DVD-14 and DVD-18 except that DualDisc technology replaces one of the DVD sides with a CD. The discs are made by fusing together a standard 0.6 mm-thick DVD layer (4.7-gigabyte storage capacity) to a 0.9 mm-thick CD layer (60-minute or 525-megabyte storage capacity), resulting in a 1.5 mm-thick double-sided hybrid disc that contains CD content on one side and DVD content on the other."

The cited “specification” is actually not accurate, as the discs would have been thicker than 1.5 mm, according to the “specification”. (There is a glue layer which is thin but can’t be neglected.) Actually, I know that during these test runs, some if not many (most?) of the prototype DualDiscs were still thicker than 1,5mm...

The current DualDisc standard from about June 2004 says that the complete disc has to be thinner than 1.5 mm, and that the DVD half disc has a minimum thickness of 0.55 mm. Which is the value which I had recommended. According to my knowledge and one private source, the DVD Forum recommends 0.565 mm thickness for the DVD, whereas my value is/was 0.56(0) mm.

I am just mentioning this, because you can see exactly the “jump” from 0.6 mm to 0.56 mm or 0.565 mm. Of course, these values are the aimed thickness for which the replication molds are adapted. Some production tolerances remain, and the final value might differ from the aim. This jump and my developments had been based on the understanding of the problems (in a theoretical way), not on “routine experimentation”. (I actually can see ample evidence that mere routine experimentation didn’t work when they were looking for a thinner DVD-plus before my first patent filing in Germany, because you still need some theoretical understanding.)

Certain adjustments to the DVD side and especially to CD side have to be made in order to ensure that the DVD-CD combination disc remains readable. Referring to the CD, there is the need for enlarged and maybe widened pits. Referring to the DVD, low jitter and slightly enlarged pits might be used. This properties are all covered in the specification of my patent application. In particular, the “single thin layer DVD” (technical term), is introduced in my patent specification and claims 5 and 36.

4. Comparison of DualDisc and (Conventional) DVD-plus, in Terms of Compatibility to Players

It is not true in its full generality that the (2003) proposed specifications for an improved DVD-CD would play “better” than a conventional hybrid DVD-CD optical

data carrier, or be more compatible to DVD readers, as I supposedly "assert". (Page 3 of the Detailed Action mailed on July 08, 2009 states: "Applicant asserts that the optical data carrier of the present invention can be played on a large number of optical disc players as compared to conventional DVD-CD optical data carriers.")

In fact, the broader question of compatibility depends on many factors, not just overall disc thickness. If the CD or DVD player tolerates discs which are thicker than 1.5 mm, in fact the opposite could be true. If you combine a 1.1 mm CD and a 0.6 mm DVD, you won't have any reading issues, the signals are as good as with normal DVD / CD discs. (CDs in 1.1 mm are completely acceptable, as the CD standard is nowhere as tight respective to optical resolution and production margins as the DVD standard!)

However, a 1.7 mm disc clearly can get stuck in some players, so you have an important mechanical problem, which even might lead to damage in extreme cases. You need thin DVD-CD discs only because some (!) players don't tolerate thicker discs than 1.5 mm. If a DVD or CD player or computer drive would be damaged, the manufacturer of the disc or the trader selling such a disc would probably have to cover the damage. No company or trading chain would like to be sued by a class action filed by users who have suffered such damages.

Therefore, your summary statement in section 1 of the Office Action (page 3) is clearly not what I ever said, nor is it necessarily a true statement: "However, it is an expected result that a decrease in DVD substrate layer thickness from current standards in a DVD-CD hybrid data carrier necessarily results in compatibility with an increased number of players."

This is too naive, as the optimum DVD thickness is 0.6 mm. The other and unrelated question is that you can't afford to risk a lot of damaged players playing "oversized" DVD-plus discs, because you basically can't sell discs which might damage "only" 0.1 % of the players in the marketplace. However, the thinner than usual DVD and CD substrates have the effect of less compatibility to DVD/CD players, considering the individually thinner CD and DVD sides.

If you introduce such discs with thin substrates (DVD, CD sides), you have to find certain countermeasures to ensure readability on DVD/CD drives. I further had to ensure that any DVD reader could focus onto the DVD side/layer of a claimed DVD-CD. You can mathematically show that any DVD reader can focus onto a single layer DVD-5 in 0.55 mm and (first) DVD-9 layer in 0.53 mm.

Although thinner than usual DVD and CD substrates/ half-discs are actually less readable than versions with the optimum values of 1.2 mm (CD) and 0.6 mm (DVD), it is simply a matter of fact that discs thicker than 1.5 mm could damage players in very rare cases, and that the DVD Forum could decide at any time that discs thicker than 1.5 mm should be illegal, as being no DVDs (according official specifications), and possibly dangerous to DVD drives/players.

Therefore and very simply said, the aim to reduce the DVD-plus to below 1.5 mm has some legal background, which I also wrote in the cited and first online article about the claimed invention. The compatibility and readability of the discs according the claimed invention is an unrelated subject, and without certain optical countermeasures, these discs would not function in an acceptable and “robust” manner. The current DualDisc could not be forbidden, and in fact it has been declared an official DVD variant later. (The non-public DualDisc standard probably doesn’t say that the DVD substrate “has” to be thinner than 0.570 mm, though this is enabled, as the specification sets 0.550 mm as lower limit. Note that this is not the “0.55 mm” of my patent application, which is derived in another way.)

5. Comments on Office Action

You wrote: “Wilkinson is not intended to disclose the specific range of DVD substrate of less than 0.570 mm and at least 0.525 mm. This limitation is rejected on the basis of lack of inventive step for discovering the optimum or workable ranges by routine experimentation.”

"However, the presence of 'standards' layer thicknesses are just one example of a preferred embodiment agreed upon value or range of values derived for commercial reasons."

As there is an optimum value for DVD thickness (0.6 mm), it is not evident by any means how routine experimentation alone would lead to the claimed invention. Several provided documents (DE 200 12 391 U1, WO 2004/017306, EP 1 436 809 B1) show that former commercial DVD-plus discs up to 2003 (included) have been thicker than 1.5 mm and the DVD substrate thickness has been 0.6 mm or close to 0.6mm, in spite of considerable work to reduce this thickness to below 1.5 mm. It is not the case that the people who have worked on these problems would be incompetent or amateurs. Sonopress is one of the biggest disc replicators of the world. Mr. Dierks and some other companies had also looked into these problems, during several years. Therefore, there is absolutely no base to state that the subject matter of my application would be obvious, when my application solves the problems for the first time in a way which is usable for mass-production of DVD-CD discs. (Note that EP 1 436 809 B1 provides another theoretical solution for this problem, but they couldn't realize this solution in practice.)

The (cited) article series of Barry Fox in Hi-Fi News confirms that the problem had been seen a long time before the invention, and the found solution therefore can't be considered to be "trivial". (Just as personal remark: I have worked several months on the solution, even if you maybe would not expect this. You certainly won't see every detail of the "background work" which was necessary. There were performed some calculations to ensure that the specifications would work, for the DVD in all cases. It was not just a short "flash" leading to the solution. Sonopress had written to me in April 2003 of their "1.54 mm" discs. So, I found one improved solution after some serious work, working on a known problem and where others have failed.)

You wrote (Office Action, pages 2 and 3): "General conditions of prior art are not necessarily restricted to a particular standard value such as DVD layer thickness. Rather, the general conditions are the knowledge disclosed in the prior art of the consequence of varying certain parameters and the effect it has on the overall system

performance. A person of ordinary skill in the art can vary these design features with predictable results.”

“However, it is an expected (?) result that a decrease in DVD substrate layer thickness from current standards in a DVD-CD hybrid data carrier necessarily results in compatibility with an increased number of players.”

This second citation is maybe just the opposite what an expert might expect. (See also again Fig. 9 and Fig. 10 in ECMA-267, 3rd edition.) Without any irony: this is just not an obvious or even true statement. It is something you assume as “certain”, and it is not.

Speaking of “general conditions of prior art” (first citation), it is clear to an engineer in this field that the problem of every DVD-plus or DualDisc is that a non-standard disc (CD side!) has to be read on standard players. Therefore, we have to work with the existing standards, which can be modified but certainly not be too far away from the (specific) DVD and CD standards, which are of course mentioned by reference in my patent applications. When some good engineers have worked from 1999 to 2003 to manufacture a “DVD-plus” in a thinner form than commercially available, nobody has suggested the solution I have found and which has been used in a commercial form in 2004 and later.

In fact, some (maybe most) engineers have seen only the focus problems in thin DVD substrates, but not the problems with spherical aberration. I think you make the same mistake. You can’t just combine a “0.5 mm” DVD and a “0.9 mm” CD, and you receive a “1.4 mm” DVD-plus. You need a solution which actually works. I have cited three and very specific (DVD-CD related) patent applications which in fact didn’t lead to a practical solution, beside of further historical evidence that there had been spent considerable work and investigation time on solving the problem of a “1.5 mm DVD-plus”. If companies and at least some good engineers have worked on the problem and didn’t succeed, it is really hard to believe that just any “average” engineer would find the solution I have found.

I think there is a harder part in the claimed invention, which is to counterbalance several parameters in a very precise way. Therefore, mere routine experimentation alone, without understanding of the involved disc standards and optical aberrations very probably won't suffice. (I think you would need luck to succeed just by routine experimentation, but normally you would fail.)

Without a real and thorough analysis on the different parameters (such as focus, spherical aberration, margins etc.), a solution won't be found. This just means that experiments alone are not automatically leading to possible new developments.

On page 3 of the Office Action, you allege: "Therefore, decreasing the DVD substrate layer in order to achieve this compatibility is not an inventive step." However, the present invention teaches a controlled and theoretically understood decrease of the DVD substrate layer. This teaching has led to a certain solution to meet some aim. In the years before the invention was made, many experts have tried – and failed – to provide a workable solution. These failed attempts alone are evidence that the present invention has not been obvious for the skilled person.

6. Summary

I have now expressed my feeling that some of your remarks might be based on some misunderstandings of patent documents, and maybe you were not yet enough informed about certain problems with hybrid discs. I believe that I have shown in a convincing case that the two documents on pages 2 and 3 of the Office Action (Maekawa, Wilkinson) are not enough related to DVD-CD hybrid discs, even more so as there exist many documents which refer specifically to hybrid discs, and more particularly to DVD-CD combination discs. Maekawa/Wilkinson just cover the normal DVD and CD standards, without any deviations.

I think that my invention as set forth in the present U.S. application and the related European and foreign applications/patents have directly led to the development of the DualDisc standard, as finalized in June 2004 by the DVD Forum. (Certainly, I had

informed several companies with direct or indirect access to the DVD Forum about my ideas and specifications before June 2004. So, I see my part as direct contribution.)

7. Remarks Concerning Section 2 of the Detailed Office Action

In response to your claim rejection under 35 U.S.C. § 112, I amended claim 5 so that the final limitation of claim 5 now reads:

- the data carrier has a DVD substrate of a thickness of less than 0.570 mm, and at least 0.55 mm.

The new limitation (lower limit) comes from claim 6, which is not needed anymore and therefore cancelled.

At this point, I would like to inform you that the limit "0.55 mm" is not based on the DVD standard (0.550 mm is the lower limit for a DVD-9 substrate thickness), but has been derived by me.

Of course, the above limit doesn't say anything about the problems with spherical aberration - note that the substrate thickness has to get thicker for low indexes, at least according the DVD standards, which is just a consequence of increased spherical aberration at lower indexes. This above limit just has the consequence that you can have a thinned DVD substrate onto which every DVD drive is able to focus, according standard definitions and a clear understanding of the focus range at different indexes. (At least for a refractive index of 1.58 and less. There is no disc material in use or even considered with a refractive index higher than 1.58. Therefore, I just say that "0.55 mm" as limit has been derived by optical/physical reasoning. I didn't write this into the patent description, it is just investigative background of the claimed invention.)

Regarding amended claim 5, "0.55 mm" is a value rounded to two decimals. Following usual practice in rounding numerical values in standard and scientific documents, this means 0.545 – 0.554 mm, in three decimals. Please look for example to page 3 of

ECMA-267 (3rd edition), chapter 5.1 ("Representation of Numbers"). Therefore, 0.55 (two decimals) as lower bound should be understood as 0.545 mm (three decimals) as minimum.

Claim 36 has been amended by reciting a DVD substrate thickness of at least 0.53 mm so that the final limitation of claim 36 now reads:

- the data carrier has a DVD substrate of a thickness of less than 0.550 mm, and at least 0.53 mm.

As recited in claim 36, the substrate thickness has to be lower than 0.550 mm, which is the lower limit for the cover layer of a DVD-9 disc. (Distance from surface to first data layer L0. See Fig. 10 of ECMA-267.)

The limit of 0.53 mm is parallel to claim 5, considering that the minimum lower limit for a DVD-9 substrate (cover layer, distance from surface to L0) is 0.02 mm thinner than a DVD-5 single layer substrate. In other words, claim 36 as presently amended is exactly parallel to claim 5. The upper substrate thickness boundary of claim 36 is 0.02 mm thinner than in claim 5, and correspondingly the lower substrate thickness boundary of claim 36 has also be specified to be 0.02 mm thinner than in claim 5. In addition, it is also possible to derive the respective lower boundaries of 0.55 mm (claim 5) and 0.53 mm (claim 36) mathematically.

Thus, the respective wordings of claims 5 and 36 are completely parallel and have the same logical background. I think this should be legitimate.

8. Remarks Concerning Section 4, Detailed Office Action

Above, I have given evidence that the developers of the DVD-plus (Dieter Dierks, Sonopress GmbH/Bertelsmann) had sought a "1.5 mm" DVD-plus in 1999, when the DVD-plus was introduced into the marketplace. There have been further attempts. The DualDisc standard (2004) is based on my specifications.

In my reaction to section I of the Office Action mailed on July 08, 2009, I referred to a number of different DVD-plus related applications/patents which cover the “1.5mm problem”. These applications/patents are:

EP 1 436 809 B1 – This patent basically says that commercial DVD-plus hybrid discs are slightly thicker than 1.5mm. I have provided the exact text passage and translation before.

DE 299 14 540 U1 and DE 200 12 391 U1 – These documents present proposals for 1.5mm discs which are (theoretically) thicker than 1.5mm, even if the opposite is claimed... Beside of this, the DVD side couldn't be read, so the applications are kind of non-enabling. (Sonopress further would have had problems in the reading of the CD side. This is because of the mentioned capacity of “650 Mbyte” on the CD side in one of their documents, which I would read as maximum capacity of the CD-ROM standard and therefore very probably not readable at all. In case of a 0.9mm CD, you have to much spherical aberration to read the 650 Mbyte CD structures.)

WO 2004/01706 – This document is a further attempt to achieve a “1.5 mm DVD-plus”. This document is not everywhere clear or accurate. For example, I don't know of any “Blue Book” which is related to any DVD standard. As this is cited as a supposed standard document, this is an important note. Some specifications and limits of the DVD standard are presented with wrong figures, derived by the supposed “Blue Book”. The deliberations on focus ranges and materials are interesting and might be impressive to non-expert readers, but often either misleading or just wrong. My impression is that Mr. Hayes didn't really understand the investigated problems, even if his writing seems quite convincing at first sight, before thorough investigation. Therefore and in short form, I firstly think WO 2004/017306 is non-enabling to solve the described problem of a DVD-plus within the 1.5 mm limit, and secondly, my invention is different compared to Hayes/Dierks (WO 2004/017306).

Therefore, I have provided ample evidence in patent documents, magazines and referring to the history of DVD-plus/DualDisc that the teachings of the claimed invention, specifically claims 5 and 36, can't be considered to be obvious to "to a person having ordinary skill in the art to which said subject matter pertains". Dieter Dierks is inventor and applicant of valid European patents. Sonopress has worked on the problem (with at least one company more – the replication department Krauss-Maffei in Munich, and maybe with Philips), so there have been working certainly some good engineers on the problem. Some of them I personally know. This is my sincere opinion, not some "rhetoric" to convince people.

Beside of the patent documents, Philips Licensing had told me in 2002/03 (personal mail) that a DVD-plus could be manufactured "in 1.6 mm". I had the direct contact with a competent person at Sonopress/Bertelsmann (now head of IP department, at this time also responsible for some areas of new technology) who told me in the first half of 2003 that they couldn't manufacture a DVD-plus disc in 1.5 mm. (See the figures of "1.54 mm" and "1.52 mm", mentioned in section 1 above.) He told me also that they really had thought about the problem, and that were some failed laboratory experiments regarding thinner discs. (Also by Mr. Dierks.)

I also have provided the article series of Barry Fox in Hi-Fi News. Barry Fox is a well-known technical journalist who has been involved precisely in patents, which was the reason I used these articles and not other ones. You didn't react to this, but this article series proves without any doubt that the disk manufacturing industry also had sought a solution for a DVD-A/CD hybrid since at least 2002/2003, in an active manner.

The claim of "obviousness" of the presented solutions can't be maintained if considering the (cited) DVD-plus related patent documents and the history of the DVD-plus and DualDisc development, in which I have participated as insider. (See also US 2006/010108 A1, filed originally in 2002, which is another hybrid disc, related to music and the disk manufacturing industry. The SACD/DVD-A, or generally SACD/DVD proposal, includes the "double hybrid" SACD/CD/DVD disc. I therefore

had been in contact with people related to the music and optical disc industries even before.)

Therefore, I disagree with your statement of any "obviousness" of the claimed invention at time of the invention. (Things often might look easier in hindsight than they were at the time an invention was made.)

I also would like to inform you that two leading engineers of Singulus AG (CEO Roland Lacher, Dr. Eberhardt who was heading one company department) had talked with me about the claimed invention shortly after I had filed the first application for my invention in Germany. There were at least three conversations, and they actually told me that this development *might* lead to a patent. The same was true in my contact with Martin Eichlseder of Krauss-Maffei in Munich, with whom I also measured the first commercial DVD-plus disc within 1.5 mm in April/May 2004. The DualDisc specification is from May 2004 and June 2004. Both developments use the features as presented in claim 5, to the best of my knowledge for both the DVD and CD side. Therefore, there is ample evidence that competent industry insiders took notice of the invention, in a constructive way.

Therefore, there is a direct relationship between the patent application and commercial developments shortly after, which is no coincidence. (Of course not everybody would admit this, if asked.)

The claimed invention is derived by theoretical considerations and deeper knowledge about the technological background (optical discs), clearly not by routine experimentation. This is pretty obvious, because I just couldn't manufacture any DVD prototypes. To say it even more pronounced, "routine experimentation" with thinner than commercially manufactured DVD-plus discs actually failed before, evidence has been given. (In my interpretation, this was because they didn't understand the problem that one needs to balance certain parameters. You have to consider focus range and spherical aberration at the same time, among other factors.)

I would further like to mention the fact that the competent examining division of the European Patent Office has granted the parallel patent EP 1 683 139 B1. Considering this, your claim of a certain "obviousness" of the present patent application would have to be based on convincing reasons. In my comments on section 1 of the Detailed Office Action above I already have pointed to the fact that documents like Maekawa and Wilkinson might be related to the DVD and CD standards, but they are not in any form specific to hybrid discs or hybrid DVD-CD discs. (On the other hand, there exist very specific DVD-plus related patent applications and issued patents, which you didn't cite at all.) Maekawa and Wilkinson don't present any deviations from the CD and DVD standards itself, at least you can't demonstrate this from the text.

You wrote in section 1 of the Detailed Office Action: "... However, general conditions of prior art disclosure include variations in disc dimensions, layer thicknesses, data structure dimensions and layer refractive indexes as examples. General conditions of prior art are not necessarily restricted to a particular standard value such as DVD layer thickness. Rather, the general conditions are the knowledge disclosed in the prior art of the consequence of varying certain parameters and the effect it has on overall system performance. A person with ordinary skill in the art can vary these design features with predictable results."

You seem to indicate that you basically can vary any parameter, in a very free form. Why are you then citing Maekawa and Wilkinson as references at all, which are referring to particular standards? Couldn't you refuse any DVD-plus related document in exactly the same way, which would mean that potential applicants shouldn't file any DVD-plus related patent, because you could or would refuse the specifications of any of these documents in a parallel way? I think you have misread Wilkinson, and your own conclusion "It is an expected result that a decrease in DVD substrate layer from current standards in a hybrid DVD-CD hybrid data carrier necessarily results in compatibility with an increased number of players" is, in my opinion, wrong, or at least extremely misleading. (People didn't expect this result, and I have given evidence for this. It is your opinion that they did. This is not supported by any evidence.)

If people didn't "expect" improved results (if anything at all), your phrase "A person of ordinary skill in the art can vary these design features with predictable results" is also not based on any evidence, but your opinion. I have given evidence that people with "ordinary skill in the art" and even good engineers didn't find the claimed invention, even if the underlying problem was known. (The problem to achieve a DVD-CD disc within 1.5 mm overall thickness, had been investigated by several parties/companies at several times.)

Therefore, your claim of a certain "obviousness" of the invention is not based on real arguments, and is actually not shared by the three examiners of the European Patent Office that issued the parallel European patent.

Your opinion contradicts everything I know as a industry insider well connected with the replication and disk manufacturing industry, and I have given documents which prove that things have not been "so clear", in spite of significant work on the improvement of the DVD-plus format.

(Please note that these remarks are of course not aimed in a personal way against you. In this case, you have to respect the opinion of other people, and consider the provided evidence. Otherwise, decisions get just arbitrary. And as I know how long it took until the DualDisc has been introduced – which can be sold as "legal" DVD! – it was my task to show that my invention was non-obvious and difficult. The presented arguments against your viewpoint cannot just be ignored. I am convinced that the combination of Maekawa and Wilkinson, at most may lead to the idea of a DVD-plus, but nothing else.)

9. Claims 5-35

In Section 4 of the Detailed Office Action, you write on page 5: "(These) ... are rejected because '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation' ".

However, a thin DVD layer in the thickness range of claim 5 is not revealed in the prior art. I have given references to several patent documents which cover the problem of a thinner than (at its time) commercially available DVD-plus. Ample evidence (different DVD-plus related patent applications and patents, magazine articles, personal contacts in the industry, the fact that a DVD-plus within the 1.5 mm limit had been actively investigated by several companies and parties) has been given that the teaching of claim 5 has not been "obvious" to the person having ordinary skill in the art at time of the filing of the claimed invention. It is further evident to me that the teaching of claim 5 had been important in the definition of a DVD-related standard (DualDisc).

"All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention."

I disagree with this statement. Beside of opposite evidence in DVD-plus related documents, this didn't happen during 5 years (from 1999 to 2003), in spite of significant work in this area.

As claim 5 is identical to the later DualDisc standard <https://www.dualdisclicensing.org/licenseBook/physical.asp> (RIAA version), it is evident that a problem has been solved. (Note that claim 5 covers the RIAA DualDisc specifications for both the DVD and CD layers and substrate thicknesses, in the two (60 and 65 minute) versions of this "specification". I don't have direct access to the DualDisc definition of the DVD Forum. However manufactured discs under the DualDisc trademark should follow the RIAA specifications, so the standards should be very similar if not identical. DVD-plus discs existed obviously since 1999, they don't have to follow these recommendations. Newer DVD-plus discs sometimes did, as measured by Krauss-Maffei and myself.)

Claim 6 and 7 are dependent claims, and currently cancelled.

Regarding claim 9, I already have written that you have – according to me – over-interpreted the cited text passage in Wilkinson.

You referred to the passage “Finally, the length of each resulting pit will be primarily determined by the duration of the corresponding EFM (or EFM Plus) data pulse, as will be the length of each intervening land” just means that the length of the writing pulse will write a 3T, 5T or 11T land.

However, even if the laser pulse could (theoretically) write every possible mark/pit length into the photoresist layer, I can’t see any hint that this was meant in the (short) text passage you have cited. There is certainly not any suggestion to change the CD and DVD standards, in fact the passage should be read in the sense that EFM and EFM Plus marks are written which correspond to the related standards, so CD standard for EFM and DVD standard for EFM Plus. (There is really no hint to EFM Plus structures that are enlarged respective to the DVD range. Note that we are here just talking about one single phrase taken out of a very complex document, by the way.)

Regarding claim 14, this is a dependent claim of claim 5. The interesting thing about claim 14 is that (within a hybrid DVD-CD and the condition of a relatively thin CD substrate thickness) the pit and land structures won’t follow the CD standards, as described in documents such as ECMA-130.

Regarding claim 16, I agree that a track spacing (“pitch”) of less than 1.6 micrometers is covered by ECMA-130, which allows a pitch between 1.5 and 1.7 micrometers. However, commercial CD Audio and CD-ROM discs are manufactured usually with a track spacing of exactly 1.6 micrometers. The claim is alone and as such certainly not inventive, but it contains some useful information.

Claim 18 points to DVD-plus thicknesses which have been used during the introduction of this format. Claim 19 contains the “aim” of the claimed invention, to present a working and manufacturable hybrid DVD-CD disc within the official maximum thickness range of both the DVD and CD standard. (Which is 1.50 mm – two decimal

figures here, see section 10.1 of ECMA-267, 3rd edition, thickness e_{11} - and 1.2 mm with maximum tolerances of -0.1 mm and $+0.3$ mm, presented on page 5 of ECMA-130. For all practical purposes, this means just the same.)

Claim 20 would refer, for example, to the size of 8 cm CD "singles". The 8 cm versions of the DVD and CD are in fact both defined by standard. DualDiscs in 8 cm (CD single size) have been commercially produced, so you find the first proposal of this special form of DualDisc in claim 5 and claim 20.

Claim 23, together with claim 24, spans the thickness range of CD substrates which might be used in commercial DVD-CD hybrid discs, such as DVD-plus and DualDisc.

Claim 26, 27 and 28 try to further improve the readability of a thin CD substrate, such as presented in claim 24. In fact, claim 26 and 28 have been confirmed to be useful, according to private information obtained as industry insider. Therefore, claim 26 - 28 contain some useful information, especially in combination with claim 24.

Regarding claim 30, you certainly wanted to write: "Maekawa fails to disclose wherein a track spacing of CD data structures is less than 1.5 micrometers", not "...less than 1.4 micrometers. (Page 15, Detailed Office Action.) Claim 30 is leaving the existing CD standard. As such, it is at least interesting.

Claim 31 to 35 contain further possible variations of a hybrid DVD-CD disc according to the claimed invention, giving some useful information for engineers about possible variations.

Claim 10 and 11 are suggesting that the readability of a thin CD layer in a DVD-CD hybrid might be improved, especially on DVD drives and DVD players with a relatively restricted focus range, if you use a disc material with a lower refractive index than polycarbonate, i.e. 1.58. This has been confirmed by experiments and is now known to companies working in this field.

I certainly believe you that the transparent materials used for commercial CDs and DVDs can be lower than 1.58, the value of polycarbonate. In fact, the cited passage of Arakawa just repeats the CD and DVD specifications, which are 1.55 ± 0.1 . (Polyolefin resins and even glass have been used for CD manufacture, for instance. PMMA has been used for both DVD and CD trials, which has an index of about 1.49. Note that the indexes might differ for different laser wavelengths.)

Claim 10 and 11 contain useful information for engineers, as alternative disc materials are not routinely used in practical CD and DVD production. Beside of this, the range between 1.40 and 1.45 is not included in the CD and DVD standard, therefore a clear novelty in this context. (As polycarbonate offers already a high compatibility of the CD side to CD drives, most DualDiscs have been manufactured with polycarbonate, which is widely available and the standard material of CD and DVD discs. Nevertheless, materials such as "Zeonor" and PMMA have been investigated, with very positive results in practical tests for "Zeonor", which belongs to the class of polyolefin polymers. Note that hybrid SACD/CD discs are already produced with this material. The refractive index of "Zeonor" is about 1.52.)

Claim 11 is obviously related to claims 26 and 27, here referring specifically to the CD side.

Claim 17 defines differences between readable, writable and partially readable and writable discs.

Referring to claim 27, I believe this is a novelty in the field of hybrid DVD-CD discs. Regarding the cited passage of Maeda (U.S. Patent No. 6,324,155, column 3, lines 26-41), I find this passage somehow confusing, as other excerpts directly contradict this (translated) passage. In fact, in column 4, lines 45 to 58 it is explicitly stated that the two substrates 22 and 24 are made of polycarbonate, so they have the same index. "The recording layer made of ultraviolet curing resin has upper and lower recording surfaces 26 and 27 ... Furthermore, refractive indexes of the adjacent substrate 22 and the

recording layer 23 are different from each other and refractive indexes of the adjacent layer 23 and the substrate 24 are different from each other.”

In the next passage, the reason for this is explained. In fact, there is no reason why the two substrates should have different indexes from each other, whereas they should differ from the index of the recording layer 23. (Column 4, Line 59 to 67.)

Therefore, the cited passage might be just a translation error, which happened during translation from the Japanese text which corresponds to column 3, lines 40 to 41. I believe the meaning could well have been that the two substrates have a different index than the recording layer, not from “each other”. Look for example to column 6, lines 32 and 33, and also to column 8, lines 49ff (two polycarbonate substrates), and column 9, lines 4ff.

Regarding the claims, claim 2 would support my view, whereas claim 5 might support your reading. However, there is not any passage in the patent which speaks clearly of two different indexes for the substrates. Even if there is no translation error in the cited text passage and claim 5 might suggest your interpretation, the application doesn't refer to discs which are read from two sides, even less to hybrid discs. Therefore, discs with substrate of a different refractive index are probably prior art, but I think this is a new feature in the context of DVD-CD discs. I am not sure about this, but claim 27 doesn't stand as single claim.

10. Remarks Concerning Section 8 of the Detailed Office Action (p. 22ff)

I didn't claim to introduce the (general) idea of a DVD-9/CD, as specific DVD-CD hybrid. In fact, a DVD-9/CD is mentioned already in document DE 200 12 391 U1, claim 8.

Referring to the documents mentioned in the Office Action (section 8, page 22), the cited text passage of Maekawa refers in a very general way to the CD standard, whereas Kuchman presents a DVD-18, which was commercially available before the claimed invention, and is part of the DVD standard. Both documents don't add anything to the

presentation of prior art in my own patent description. They are not related to hybrid discs, and don't suggest any deviations from the existing CD and DVD standards.,

I have given ample and different evidence why claim 5 should be regarded as inventive before.

If claim 5 is inventive, the same is true for claim 36, because they are basically parallel.

"All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention." (page 23)

I disagree. This didn't happen within 5 years (from 1999 to 2003), in spite of significant work on this subject. I could tell how the commercial DVD-plus changed from 1999 to 2002/2003, but certainly nobody had done or proposed what is the technical teaching of claim 36.

A disc according claim 36 is not part of the DualDisc standard. In fact, nobody ever has commercially produced such a disc. However, claim 36 would probably be absolutely necessary to manufacture a DVD-9/CD in ≤ 1.5 mm, whereas it might be possible to manufacture a (DVD-5) DVD-CD in ≤ 1.5 mm without claim 5, although claim 5 facilitates this aim a lot. (And is therefore used for DualDiscs.)

This is even a further hint that claim 36 has to be regarded as inventive, because the successful manufacturing of a DVD-9/CD disc within the 1.5 mm disc thickness limit might require the application of this claim 36.

Regarding claim 40, this is the parallel claim to claim 14.

Claim 41 and claim 42 are the parallel claims to claim 18, 16 and 19.

Claim 42 is (such as claim 19) of special interest, as it represents one important aim of the claimed invention (disc ≤ 1.5 mm).

Claim 43 is the parallel claim to claim 20.

Claim 45 is the parallel claim to claims 23 and 24.

Claim 46 is the parallel claim to claim 26.

Claim 48 is the parallel claim to claims 29 and 35.

Claim 37 is related to claim 9. As argued before, Wilkinson doesn't suggest any deviations from the DVD standard.

Claims 38 and 39 are related to claims 10 and 11, referring to the CD side of a DVD-CD hybrid.

Regarding claim 27 (page 32 of the Detailed Action), you certainly meant the parallel claim 47.

Regarding claim 44 and my own patent application introducing a hybrid SACD/CD disc, I certainly have thought about a hybrid SACD/CD/DVD disc already in 2002. However, I didn't think of a thin DVD layer such as presented in claims 5 and 36, therefore there is a clear difference.

I point to the fact that my own document (Schreiber '108) refers to different forms of hybrid discs in the reviewed prior art, what Maekawa and Kuchman don't do. I can't see where Maekawa and Kuchman would introduce any new prior art which I didn't mention in Schreiber '108 myself. (DVD standard, Double-sided DVD discs.) In fact, a hybrid SACD/DVD is related to double-sided DVD discs, and I reviewed the commercially existing DVD-plus (2002). Therefore, Schreiber '108, as single

document, offers the same state of prior art as the combination of Maekawa, Kuchman and Schreiber together, if we are talking about hybrid optical discs.

11. Closing remarks

I have mentioned several specific DVD-plus documents in this response to the Office Action of July 08, 2009, and I have indicated where the claimed invention clearly departs and improves.

I have given reasons why things can't be obvious if several companies failed to see the found solutions during more than four years in spite of significant investigation in this field. Cited patent documents with reference to DVD-plus discs don't lead to the suggested solutions and specifications, but present fundamentally different specifications, or in several cases failing specifications. "Routine experimentation" / laboratory experiments probably also have been undertaken, and it seems they have failed to provide a working or convincing solution. (My invention is derived by an theoretical approach and some calculations, as I didn't have the means to do "routine experiments" under laboratory conditions.)

I actually believe that some (suspected) laboratory experiments obviously have failed to improve the existing DVD-plus.

The clear aim of the proposed invention was to present a working DVD-CD having a thickness 1.50 mm or less (overall thickness limit of CD and DVD discs).

I wrote in my first article about the claimed invention, on the 13th of January 2004:

"Stefan Schreiber Lissabon, 13. 1. 2004

P.S.: Ach ja, das Forum könnte demnach eine DVD-CD offiziell definieren. Denn warum sollte eine "offizielle DVD" keinen "offiziellen Segen" im Forum erhalten?

Es ist eine Frage des Stils, und wer weiß, vielleicht liest Toshiba ja mit. Angeblich will Warner ja eine DVD-A/CD. Also, macht mal, ich warte..."

Source: <http://www.loehneysen.de/archiv/2004/dvdsacd/dvd-cd.html>

Translation:

"P.S.: Indeed, the (DVD) Forum could accordingly define a DVD-CD in an official way. Because why should an "official DVD" not obtain an "official blessing" within the Forum? It is a question of style, and who knows, maybe Toshiba will read these lines, together with you. And people say that Warner does want a DVD-A/CD. Ok, do something! I am waiting..."

It is historically clear that Warner and Toshiba gave their agreement to the DualDisc specification (in concordance with claim 5 of the claimed invention) just some 5 months later. Well, I certainly told them to do so!

In the cited reference and a little bit before, I am thanking Singulus for the "provided support", and I am writing that I have talked to two leading managers of this company. Singulus is represented in the DVD Forum, and was in favor of an improved DVD-plus.

It is therefore clear that my invention had some real impact within the industry, and that an optical disc standard has been influenced by my invention.

Respectfully submitted,

Stefan Schreiber